Practitioner's Docket No. AP9691

CHAPTER II

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/EP00/09044	15/Sept/2000	23/Sept/1999
INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED

Actuating Unit for an Electromechanically Actuated Disc Brake
TITLE OF INVENTION

Johann Jungbecker; Stefan Schmitt; Oliver Hoffmann; Joachim Nell; Ernst Neuwirth; Wendelin Backes
APPLICANT(S)

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

NOTE *To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO, and (2) the basic national fee (see 37 C F R § 1 492(a)) The 30-month time limit may not be extended 37 C F R § 1 495*

WARNING: *Where the items are those which can be submitted to complete the entry of the international application into the*

CERTIFICATION UNDER 37 C.F.R. 1.10*
*(Express Mail label number is **mandatory**)*
(Express Mail certification is optional)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date 3/22/02, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EV051019275US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

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WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C F R 1 8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

WARNING:* *Each paper or fee filed by "Express Mail" **must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C F R 1 10(b)*
*"Since the filing of correspondence under § 1 10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct 24, 1996, 60 Fed Reg. 56,439, at 56,442*

national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C F R §1 8

NOTE Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C F R § 1 494(f)

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:

   a. [X] This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).

   b. [X] The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2.Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
[ ]*	TOTAL CLAIMS	37 - 20 =	17	x $ 18.00 =	$306.00
	INDEPENDENT CLAIMS	1 - 3 =		x $ 84.00 =	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + $280.00				
BASIC FEE**	[ ] U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: [ ] and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) .... $100.00 [ ] and the above requirements are not met (37 CFR 1.492(a)(1)) ..... $710 00 [X] U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1 482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: [ ] has been paid (37 CFR 1.492(a)(2)) .... $740.00 [ ] has not been paid (37 CFR 1.492(a)(3)) ..... $1040.00 [X] where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) $890.00				
	Total of above Calculations				= 890.00
SMALL ENTITY	Reduction by ½ for filing by small entity, if applicable. Affidavit must be filed. (note 37 CFR 1.9, 1.27, 1.28)				-
	Subtotal				
	Total National Fee				$ 1,196.00
	Fee for recording the enclosed assignment document $40 00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				$ 1,196.00

*See attached Preliminary Amendment Reducing the Number of Claims.

i. [ ] A check in the amount of _____ to cover the above fees is enclosed.

ii. [X] Please charge Account No. 18-0013 in the amount of $ 1196.00.

A duplicate copy of this sheet is enclosed.

**WARNING. *"To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date. * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C F.R § 1 495(b)*

WARNING. *If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office 37 C F.R. § 1.495(b)(2) The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date The payment of the processing fee set forth in § 1 492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date Failure to comply with these requirements will result in abandonment of the application The provisions of § 1.136 apply to the period which is set Notice of Jan. 3, 1993, 1147 O G 29 to 40*

3. [X] A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE *Section 1 495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date " Notice of Jan. 7, 1993, 1147 O G 29 to 40, at 35-36 See item 14c below.*

a. [X] is transmitted herewith.

b. [ ] is not required, as the application was filed with the United States Receiving Office.

c. [ ] has been transmitted

i. [ ] by the International Bureau.
Date of mailing of the application (from form PCT/IB/308): _____.

ii. [ ] by applicant on _____.
Date

4. [X] A translation of the International application into the English language (35 U.S.C. 371(c)(2)):

a. [X] is transmitted herewith.

b. [ ] is not required as the application was filed in English.

c. [ ] was previously transmitted by applicant on _____.
Date

d. [ ] will follow.

5. [ ] Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R § 1 495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1 121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36

a. [ ] are transmitted herewith.
b. [ ] have been transmitted
   i. [ ] by the International Bureau.
   Date of mailing of the amendment (from form PCT/IB/308): _____.
   ii. [ ] by applicant on _____. Date
c. [ ] have not been transmitted as
   i. [ ] applicant chose not to make amendments under PCT Article 19.
   Date of mailing of Search Report (from form PCT/ISA/210): _____.
   ii. [ ] the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. [ ] A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)):
   a. [ ] is transmitted herewith.
   b. [ ] is not required as the amendments were made in the English language.
   c. [ ] has not been transmitted for reasons indicated at point 5(c) above.

7. [x] A copy of the international examination report (PCT/IPEA/409)
   [x] is transmitted herewith.
   [ ] is not required as the application was filed with the United States Receiving Office.

8. [ ] Annex(es) to the international preliminary examination report
   a. [ ] is/are transmitted herewith.
   b. [ ] is/are not required as the application was filed with the United States Receiving Office.

9. [ ] A translation of the annexes to the international preliminary examination report
   a. [ ] is transmitted herewith.
   b. [ ] is not required as the annexes are in the English language.

10. [X] An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115
   a. [ ] was previously submitted by applicant on _____. Date
   b. [ ] is submitted herewith, and such oath or declaration
      i. [ ] is attached to the application.
      ii. [ ] identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.

iii. [X] will follow.

Other document(s) or information included:

11. [x] An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
    a. [x] is transmitted herewith.
    b. [ ] has been transmitted by the International Bureau.
       Date of mailing (from form PCT/IB/308): _____.
    c. [ ] is not required, as the application was searched by the United States International Searching Authority.
    d. [ ] will be transmitted promptly upon request.
    e. [ ] has been submitted by applicant on _____.
       Date

12. [X] An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
    a. [X] is transmitted herewith.
       Also transmitted herewith is/are:
       [X] Form PTO-1449 (PTO/SB/08A and 08B).
       [X] Copies of citations listed.
    b. [ ] will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
    c. [ ] was previously submitted by applicant on _____.
       Date

13. [ ] An assignment document is transmitted herewith for recording.

    A separate [ ] "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or[ ] FORM PTO 1595 is also attached.

    _____
    _____
    _____

14. [X] Additional documents:
    a. [ ] Copy of request (PCT/RO/101)
    b. [x] International Publication No. WO01/21974
       i. [ ] Specification, claims and drawing
       ii. [x] Front page only
    c. [X] Preliminary amendment (37 C.F.R. § 1.121)
    d. [ ] Other

    _____
    _____
    _____

15. [X] The above checked items are being transmitted

a. [X] before 30 months from any claimed priority date.
b. [ ] after 30 months.

16. [ ] Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:

_____
_____
_____

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized*

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1 17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C F R § 1.136(a)(3).

NOTE "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account " 37 C F R. § 1 26(a)

[X] The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 18-0013.

[X] 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1 495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

[X] 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C F R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action

[X] 37 C.F.R. 1.17 (application processing fees)
[X] 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).
[ ] 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE. Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of

allowance. 37 C F R. § 1.311(b)

NOTE: 37 C.F.R. 1 28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying issue fee " From the wording of 37 C F R § 1.28(b). (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity

[X] 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

SIGNATURE OF PRACTITIONER

Reg. No.: 33,373

Joseph V. Coppola, Sr.
(type or print name of practitioner)

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AP9691

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Jungbecker et al.

Int'l Application No.: PCT/EP00/09044

Int'l Filing Date: 15. September 2000

Serial No.: Group Art Unit:

Filed: Herewith Examiner:

For: Actuating Unit for an Electromechanically Actuated Disc Brake

Attorney Docket No.: AP9691 Paper No.

Box PCT
Commissioner of Patents
Washington, D.C. 20231
Attn: EO/US

CERTIFICATE OF MAILING/TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this correspondence is, on the date shown below, being:

☒ deposited with the United States Postal Service with sufficient postage as Express Mail, Post Office to Addressee, Mailing Label No.: _EV051019275US_, addressed to Box PCT, Commissioner of Patents, Washington, DC 20231

☐ transmitted by facsimile to the Patent and Trademark Office. to Examiner _____ at _____

Signature: Joyce Krumpe

Date: 3/22/02

Joyce Krumpe

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the application as follows prior to examination on the merits.

IN THE CLAIMS

Please cancel claims 1-37 and add the following new claims.

38. (New) Actuating unit for an electromechanically actuated disc brake for automotive vehicles that is mounted to a brake caliper in which two friction linings are arranged to slidably interact with each one lateral surface of a brake disc, wherein one of the friction linings is movable into engagement with the brake disc by the actuating unit directly by means of an actuating element and the other friction lining is movable into engagement with the brake disc by the effect of a reaction force generated by the brake caliper, wherein the actuating unit comprises:

an electric motor,

a reducing gear engaged with the electric motor,

a freewheel mechanism coupled to the electric motor, wherein the freewheel mechanism is configured to exert a binding effect on a bearing which supports the motor rotor thereby preventing rotation movement of the bearing.

39.(New) Actuating unit as claimed in claim 38, wherein the freewheel mechanism along with the bearing forms a subassembly.

40.(New) Actuating unit as claimed in claim 39, wherein both an outside ring and an inside ring of the bearing are extended on one side in such a fashion that they enter into a form-locking engagement with the clamping element of the freewheel mechanism.

41.(New) Actuating unit as claimed in claim 40, wherein the inside ring of the bearing has a profile which permits a form-locking accommodation of the clamping element, and the outside ring has at least one radial recess and a subsequent slope or ramp which, along with the profiling, defines at least one clamping slot in which the clamping element is received.

42.(New) Actuating unit as claimed in claim 41, wherein the clamping element is biased in the direction of the radial recess by means of a spring element.

43.(New) Actuating unit as claimed in claim 42, wherein the spring element is configured as a circlip.

44.(New) Actuating unit as claimed in claim 42, wherein the spring element is configured as a leaf spring.

45.(New) Actuating unit as claimed in claim 38, wherein the freewheel mechanism is operable by means of an electromagnet.

46.(New) Actuating unit as claimed in claim 45, wherein the electromagnet includes of an electromagnet and a tappet which is movable into a force-transmitting engagement with the clamping element.

47.(New) Actuating unit as claimed in claim 46, wherein the electromagnet is designed as a bistable electromagnet.

48.(New) Actuating unit as claimed in claim 40, wherein the clamping element is designed as a jamming roller.

49.(New) Actuating unit as claimed in claim 40, wherein the clamping element has the shape of a ball.

50.(New) Actuating unit as claimed in claim 38, wherein the bearing is designed as a ball bearing, a needle bearing, or a roller bearing.

51.(New) Actuating unit as claimed in claim 38, wherein a second reducing gear is provided between the electric motor and the reducing gear.

52.(New) Actuating unit as claimed in claim 51, wherein the electric motor, the first reducing gear and the second reducing gear are designed as at least two independent subassemblies.

53.(New) Actuating unit as claimed in claim 51, wherein the electric motor, the first reducing gear and the second reducing gear are designed as one subassembly.

54.(New) Actuating unit as claimed in claim 38, wherein the first reducing gear is configured as a ball-and-thread drive assembly.

55.(New) Actuating unit as claimed in claim 38, further including an actuating element disposed between the reducing gear and one of the disk brakes,

wherein the actuating element is formed by the threaded nut of the ball-and-thread drive assembly.

56.(New) Actuating unit as claimed in claim 51, wherein the second reducing gear is arranged on a side of the electric motor remote from the brake linings.

57.(New) Actuating unit as claimed in claim 51, wherein the second reducing gear is configured as a planetary gear.

58.(New) Actuating unit as claimed in claim 57, wherein the second reducing gear is configured as a planetary gear with stepped planet wheels.

59.(New) Actuating unit as claimed in claim 55, wherein a guide member is provided which embraces the threaded nut of the ball-and-thread drive assembly, which is supported on a gearbox case that accommodates the ball-and-thread drive assembly, and on which the threaded spindle is axially supported.

60.(New) Actuating unit as claimed in claim 59, wherein the axial support of the threaded spindle is carried out by means of a radial collar.

61.(New) Actuating unit as claimed in claim 59, wherein force-measuring elements are provided on the guide member.

62.(New) Actuating unit as claimed in claim 59, wherein an elastic seal is interposed between the threaded nut and the guide member.

63.(New) Actuating unit as claimed in claim 57, wherein a sun wheel of the planetary gear is designed on the rotor, while the planet wheels are mounted in a planet cage that is in a force-transmitting connection with the threaded spindle and are comprised of each one first planet wheel of large diameter that is in engagement with the sun wheel and each one second planet wheel of small diameter that is in engagement with a ring gear.

64.(New) Actuating unit as claimed in claim 63, wherein the ring gear of the planetary gear is formed of an internal toothing in a cover which represents a case of the planetary gear and is mounted on the casing of the electric motor.

65.(New) Actuating unit as claimed in claim 63, wherein the transmission of force between the planet cage and the threaded spindle is effected by means of a form-locking plug coupling.

66.(New) Actuating unit as claimed in claim 63, wherein the planet cage is mounted in the cover by means of a radial bearing.

67.(New) Actuating unit as claimed in claim 63, wherein the form-locking plug coupling is connected to the planet cage in a torsion-proof, radially yielding and flexible fashion.

68.(New) Actuating unit as claimed in claim 59, wherein the threaded spindle is of a multi-part design.

69.(New) Actuating unit as claimed in claim 55, wherein the threaded nut at its end remote from the first friction lining includes a projection which is movable into abutment with a stop that is provided on the threaded spindle and acts in a circumferential direction.

70.(New) Actuating unit as claimed in claim 38, wherein the electric motor is configured as an electronically commutated electric motor energized by a permanent magnet.

71.(New) Actuating unit as claimed in claim 38, wherein the electric motor is configured as a switched reluctance motor.

72.(New) Actuating unit as claimed in claim 38, wherein a position detection system is provided which permits detecting the position of the rotor.

73.(New) Actuating unit as claimed in claim 72, wherein the position detection system includes a Hall sensor.

74.(New) Actuating unit as claimed in claim 72, wherein the position detection system includes a magnetoresistive element.

REMARKS

Prior to a formal examination of the above-identified application, acceptance of the new claims and the enclosed substitute specification (under 37 CFR 1.125) is respectfully requested. It is believed that the substitute specification and new claims will facilitate processing of the application in accordance with M.P.E.P. 608.01(q). The substitute specification and new claims are in compliance with 37 CFR 1.52 (a and b) and, while making no substantive changes, are submitted to conform this case to the formal requirements and long-established formal standards of U.S. Patent Office practice, and to provide improved idiom and better grammatical form.

The enclosed substitute specification is presented herein in both marked-up and clean versions.

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STATEMENT

The undersigned, an attorney registered to practice before the office, hereby states that the enclosed substitute specification includes the same changes as are indicated in the mark-up copy of the original specification. The substitute specification contains no new subject matter.

Respectfully submitted,

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CUSTOMER NO. 010291

r0140747.txt

3/PRTS

Actuating Unit for an Electromechanically Actuated Disc Brake

The present invention relates to an actuating unit for an electromechanically actuated disc brake for automotive vehicles that is mounted on a brake caliper in which two friction linings are arranged that interact with each one lateral surface of a brake disc so as to be slidable within limits, wherein one of the friction linings is movable into engagement with the brake disc by the actuating unit directly by means of an actuating element and the other friction lining is movable into engagement with the brake disc by the effect of a reaction force generated by the brake caliper, wherein the actuating unit is comprised of an electric motor and a reducing gear interposed between the electric motor and the actuating element, and wherein a freewheel mechanism is provided that is in interaction with the electric motor and has the function of a parking brake.

EP 0 402 421 B1 discloses an electromechanic actuating unit of this type. The electric motor drives the reducing gear by way of the freewheel mechanism in the prior-art actuating unit. The freewheel mechanism which permits a frictional torque transmission prevents a rotational movement of the electric motor in the direction opposite to its actuating direction or in the release direction of the brake when reaction forces occur and, thus, acts as a parking brake.

What is disadvantageous in the prior-art actuating unit is, especially, the functional principle of the freewheel mechanism employed, the clamping effect of which will slowly yield in a high-frequent excitation or under vibration stress due to a micro-sliding action in the loading direction so that the

retaining force required cannot be ensured. This means that a freewheel mechanism of this type is inappropriate for use under safety aspects, such as e.g. in the operation of a parking brake, where it is absolutely imperative to maintain the holding effect.

In view of the above, an object of the present invention is to disclose an electromechanic actuating unit of the type initially referred to wherein an inadvertent release of the parking brake is prevented, thereby increasing its reliability in operation. Another objective is to achieve a space-saving, compact construction of the electromechanic actuating unit.

According to the present invention, this object is achieved in that the freewheel mechanism is configured so that its clamping effect is ensured by a form-locking torque transmission, and that, in its actuated state, it prevents a rotational movement of a bearing in which the rotor of the electric motor is mounted. Preferably, the bearing may be configured as a ball bearing, a needle bearing, or a roller bearing.

To specify the idea of the present invention, a favorable aspect of the present invention arranges for the freewheel mechanism to form a subassembly with the bearing, and both the outside and the inside ring of the bearing are extended on one side in such a fashion that they enter into a form-locking engagement with the clamping element of the freewheel mechanism. These measures permit the integration of components in a much more compact manner.

In a preferred aspect of the subject matter of the present invention, the inside ring of the bearing has a profiling which permits a form-locking accommodation of the clamping element, and the outside ring has at least one radial recess and a subsequent slope or ramp which, along with the profiling,

limits at least one clamping slot in which the clamping element is received.

In another embodiment of the present invention, the clamping element is biassed in the direction of the recess by means of a spring element. Favorably, the spring element is configured as a circlip or a leaf spring.

An actuation of the parking brake of the present invention which is easy to realize and ensures a reliable operation is achieved according to another feature of this invention because the freewheel mechanism is operable by means of an electromagnetic actuating unit.

The electromagnetic actuating unit is preferably comprised of an electromagnet and a tappet which is movable into a force-transmitting engagement with the clamping element, and the electromagnet is designed as a bistable electromagnet.

The clamping element may be configured as a jamming roller or a ball.

In a particularly favorable embodiment of the subject matter of the present invention, the reducing gear is configured as a ball-and-thread drive assembly, the actuating element being the threaded nut of the ball-and-thread drive assembly.

To considerably reduce the necessary drive torque to be produced by the electric motor, the force transmission between the electric motor and the reducing gear is effected by means of a second reducing gear.

In a preferred aspect of the subject matter of the present invention, the electric motor, the (first) reducing gear, and the second reducing gear are designed as at least two independent assemblies so that the electric motor is arranged

outside the flux of force of the clamping force and its function cannot be impaired by disturbing influences. Besides, this uncouples the second reducing gear from the (first) reducing gear so that, especially when the second reducing gear is configured as a planetary gear, an equal position of the rotor of the electric motor in relation to the planet wheels and of the planet wheels in relation to the ring gear can be ensured. Designing the second reducing gear as a planetary gear permits considerably reducing the necessary drive torque that is to be generated by the electric motor, with the planetary gear representing an anti-friction gear which does not require any work of deformation and allows achieving a high efficiency with a small mounting space.

It is especially favorable that the electric motor, the first reducing gear, and the second reducing gear is designed as one independent subassembly each. An electromechanic actuating unit of a like design is characterized by high efficiency, extraordinary dynamics of brake actuation, and an extremely compact construction permitting high mass-related brake torques to be transmitted. Besides, subassemblies of a modular design can be constructed and tested separately.

In a favorable aspect of the subject matter of the present invention, the second reducing gear is arranged on the side of the electric motor remote from the brake linings. This measure permits a constructive uncoupling of the second reducing gear from the first reducing gear so that deformation of the second reducing gear is effectively prevented and clearances can be maintained constant within the gear unit.

A higher gear ratio is achieved in another embodiment of the subject matter of the present invention in that the second reducing gear is configured as a planetary gear, preferably with stepped planet wheels. It is, however, also possible to design the second reducing gear as a two-step differential

planetary gear. In the last-mentioned gear type, an optimal overall length is achieved because a large sun wheel can be used.

According to another feature of the present invention, uncoupling of the flux of force from the drive unit or the electric motor is ensured because there is provision of a guide member which is supported on a casing that accommodates the ball-and-thread drive assembly and embraces the threaded nut, the threaded spindle being axially supported on the guide member. The axial support of the threaded spindle is carried out by the intermediary of an axial bearing by means of a radial collar. This allows using a bearing with a very small diameter.

Besides, it is particularly advantageous that force-measuring elements are provided on the guide member, thereby allowing to effect force measurements at the part that is not moved and is subject to a defined deformation.

An effective protection of the arrangement against contaminants and the ingress of water is achieved due to an elastic seal or sleeve that is interposed between the threaded nut and the guide member.

In another favorable embodiment of the subject matter of the present invention, the sun wheel of the planetary gear is designed on the rotor, while the planet wheels are mounted in a planet cage (which is in a force-transmitting connection with the threaded spindle) and are comprised of a first planet wheel of large diameter that is in engagement with the sun wheel and a second planet wheel of small diameter that is in engagement with a ring gear.

The mounting space is optimized in the above-mentioned design because the ring gear of the planetary gear is formed by an

internal toothing in a cover which represents a case of the planetary gear and is mounted on the casing of the electric motor.

In another embodiment of the subject matter of the present invention, the assembly of the actuating unit of the present invention is considerably simplified because the transmission of force between the planet cage and the threaded spindle occurs by means of a form-locking plug coupling.

A low-cost design of the actuating unit of this invention involves that the planet cage is mounted in the cover by means of a radial bearing. A planetary gear of this type is easy to manufacture and allows separate testing.

It is suitable that the form-locking plug coupling is coupled to the planet cage in a torsion-proof, radially yielding and flexible fashion. This measure allows an effective isolation of disturbing influences.

The threaded spindle may preferably have a multi-part design.

In another favorable design of the subject matter of the present invention, the threaded nut at its end remote from the first friction lining includes an axial projection which is movable into abutment with a stop that is provided on the threaded spindle also in an axial direction and acts in a circumferential direction. Jamming or clamping of the first reducing gear is prevented by this provision, in particular in a faulty release action, where the threaded nut is reversed until its stop.

In further favorable embodiments of the present invention, the electric motor may be configured as an electronically commutated electric motor (non-brush d-c motor) energized by a

permanent magnet, or a switched reluctance motor (SR = Switch Reluctance motor).

The types of motors mentioned above are especially suited to produce high torques during standstill.

In order to electronically commutate the motor of the actuating unit, it is necessary to provide a position detection system which permits detecting the position of the rotor of the electric motor in relation to the stator and, preferably, includes a Hall sensor or a magnetoresistive element.

The present invention will be explained in detail in the following description of an embodiment by making reference to the accompanying drawings. In the drawings,

Figure 1 is an axial cross-sectional view of a design of the electromechanic actuating unit of the present invention.

Figure 2 is a design view of the parking brake device utilized in the actuating unit of Figure 1.

Figure 3 is a broken view of the parking brake device of Figure 2 in its rest position.

Figure 4 is a broken view of the parking brake device of Figure 2 in its actuated position.

The electromechanic actuating unit of the present invention, as shown in the drawings, is used to actuate a floating-caliper disc brake whose brake caliper (only represented) is slidably supported in a stationary holder (not shown). A pair of friction linings 4 and 5 is arranged in the brake caliper so that they face the left-hand and right-hand lateral surface of a brake disc 6.

In the following, friction lining 4 that is shown on the right in the drawing is referred to as first friction lining, and the other friction lining designated by reference numeral 5 is referred to as second friction lining. While the first friction lining 4 is movable into engagement with the brake disc 6 by the actuating unit directly by means of an actuating element 7, the second friction lining 5 is urged against the opposite lateral surface of brake disc 6 by the effect of a reaction force generated by the brake caliper, when the assembly is actuated.

The actuating unit of the present invention which is fitted to the brake caliper by way of securing means (not shown), has a modular design and is generally comprised of three independent subassemblies or modules, namely a drive unit 1, a first reducing gear 2 that actuates the first friction lining 4, and a second reducing gear 3 that is interconnected in terms of effect between drive unit 1 and the first reducing gear 2.

The actuating unit 1 mentioned above is comprised of an electric motor 10 which, in the example shown, is a permanent-magnet-energized, electronically commutated motor whose stator 9 is immovably arranged in a motor casing 8 and whose rotor 11 is provided by an annular carrier 13 that carries a plurality of permanent magnet segments 14. The first reducing gear 2 is interposed between the electric motor 10 and the above-mentioned actuating element 7 in terms of effect and, in the example shown, is configured as a ball-and-thread drive assembly 16 to 21 accommodated in a gearbox case 15, which may also be of integral design with the above-mentioned brake caliper. In this arrangement, the ball-and-thread drive assembly comprises a threaded nut 16 and a threaded spindle 17, with several balls 18 being arranged between the threaded nut 16 and the threaded spindle 17 which circulate upon a rotational movement of the threaded spindle 18 and put the threaded nut 16 into an axial or translatory movement. The

threaded nut 16 preferably forms the above-mentioned actuating element 7. The threaded spindle 17 driven by the electric motor 10 by way of the second reducing gear 3 preferably has a three-part design and is comprised of a tubular first spindle member 19 which is in engagement with the threaded nut 16 by means of the above-mentioned balls 18, an annular second spindle member 20, and a third spindle member 21.

The arrangement is preferably chosen so that the rotor 10 of the motor 11 drives the third spindle member 21 by the intermediary of the second reducing gear 3, and the threaded nut 16 is supported on the first friction lining 4.

In the embodiment of the present invention illustrated in the drawings, the necessary engine torque is reduced by an expedient integration of a planetary gear 30 - 34 which forms the above-mentioned second reducing gear 3. The planetary gear, which is interposed between rotor 11 and threaded spindle 17 in terms of effect, is comprised of a sun wheel 30 which preferably includes an externally toothed area 22 on rotor 11, a plurality of stepped planet wheels, two of which are shown and have been assigned reference numerals 31 and 32, and a ring gear 33. The stepped planet wheels 31, 32 accommodated in a planet cage 34 have a first step interacting with the sun wheel 30 and a second step interacting with the ring gear 33, the first step being formed of toothed wheels 31a, 32a of large diameter and the second step being formed of toothed wheels 31b, 32b of small diameter. Preferably, the above-mentioned planet cage 34 is configured so that its area positioned between the points of support of the planet wheels 31, 32 and the point where the threaded spindle 17 is coupled allows a small axial clearance and a radial clearance and a small offset angle and, for example, is configured as a lamellar plate or a pleated bellows. Ring gear 33 is formed of an internally toothed area of a cover 23 that represents the case of the planetary gear.

The above-mentioned threaded nut 16 of the ball-and-thread drive assembly is guided and mounted in a bowl-shaped guide member 12. The mounting support of the threaded nut 16 in the guide member 12 is carried out in its area close to the first friction lining 4 by means of a first slide ring 28 arranged in guide member 12 as well as in its end area remote from the friction lining 4 by means of a second slide ring 29 arranged on the threaded nut 16.

Further, it can be taken from Figure 1 that the second annular spindle member 20 is supported on an axial bearing 26 which is arranged within the guide member 12, while the third spindle member 21 is connected to the planet cage 34 of the second reducing gear 3 by means of a form-locking plug coupling. For this purpose, the end of the third spindle member 21 is e.g. configured as a Torx connection or a hexagon that is slipped into a matingly shaped opening in the planet cage 34. It is especially favorable that the form-locking plug coupling is coupled to the planet cage 34 in a torsion-proof, radially yielding and flexible manner. Coupling is effected by means of an outside ring 51 of a radial bearing 50 provided in the cover 23. An elastic seal or sealing sleeve 27 interposed between the threaded nut 16 and the guide member 12 prevents the ingress of contaminants into the interior of the ball-and-thread drive assembly.

Moreover, it is expedient for a proper functioning of the actuating unit of the present invention when the threaded nut 16, at its end remote from the friction lining 4, has an axial projection (not shown) which, during its resetting action, interacts with a stop that is provided on the periphery of the second spindle member 20. Further resetting of the threaded nut 16 is effectively prevented by supporting a lateral surface of the projection on the stop so that the two members 16, 20 will not be jammed.

There is provision of a position detection system 46 (not shown) to determine the current position of the rotor 11. The position information is then determined by means of a Hall sensor or a magnetoresistive element.

In order to realize the function of a parking brake, the actuating unit of the present invention includes electromechanic means which interact with the rotor 11 of the electric motor 10 and permit it being locked. In the embodiment shown, the electromechanic means is an electromagnetically operable freewheel mechanism which has been assigned reference numeral 35 and interacts with a radial bearing 24 in which the rotor 11 is mounted. The electric actuator means associated with the freewheel mechanism 35 is designed in the way of a mechanic flipflop whose condition changes with each short energization.

As can be taken from Figures 2 to 4 in particular, the basic parts of freewheel mechanism 35 are integrated in the above-mentioned radial bearing 24. To this end, both the outside ring 36 and the inside ring 37 of the radial bearing 24 are extended on one side so that they confine an annular chamber in which a clamping element 38 is received. A form-locking engagement between the bearing rings 36, 37 and the clamping element 38 is achieved due to the special configuration of the extended area of the bearing rings 36, 37. The outside ring 36, preferably in its area interacting with the clamping element 38, includes a radial recess 39 which is confined on one side by a slope or ramp 40, while the inside ring 37 includes a profiling 41 which corresponds to the contour of the clamping element 38 and, along with the recess, limits a clamping slot. Clamping element 38 which may be designed as a jamming roller or as a ball is biassed towards the above-mentioned recess 39 by means of an annular spring element 42.

The freewheel mechanism 35 is actuated by an electromagnetic actuating device which is designated by reference numeral 43 in the example shown. The actuating device 43 is basically composed of a bistable electromagnet 44 and a tappet 45 which interacts with the armature of the electromagnet 44 and adjusts the clamping element 38 radially when the electromagnet 44 is activated. Tappet 45 is guided in a tubular guide 47 which is shaped at an annular accommodating member 48 that receives the outside bearing ring 36 and is arranged in the motor casing 8.

The following sequence of operations is provided:
Initially, the electromechanic brake is tensioned to reach the necessary level of tensioning force. Rotor 11 or inside bearing ring 37 is moved during tensioning in opposition to the clamping direction of the freewheel mechanism 35, i.e., to the right in the drawing. When the clamping element 38 is shifted in the direction of the profiling 41 during actuation of the parking brake due to activation of electromagnet 44, it will roll on the above-mentioned ramp 40 into the tapering clamping slot. When the current supplied to the electric motor 10 is reduced, the spring force of the tensioned brake will tend to turn the rotor 11 or the inside bearing ring 37 in the clamping direction. This will reliably lock the parking brake. The actuated position of the parking brake is illustrated in Figure 4.

For release purposes, the electric motor 10 must tension the brake only slightly and the electromagnet 44 must be actuated only one time in order to move the tappet 45 in an upward direction. The clamping element 38 which is thereby relieved from load is urged by the force of the spring element 42 biassing it into the recess 39 of the outside bearing ring 36, and the rotor 11 is freely rotatable in both directions.

Of course, various modifications are feasible in the spirit of the present invention. For example, the electric motor that is used as drive unit 1 may be designed as a switched reluctance motor (SR-motor). Other designs of the planetary gear are also possible, such as a two-stepped differential planetary gear or a gear whose planet wheels with their first step are in engagement with a sun wheel and with their second step, by the intermediary of each one spur wheel, are in engagement with a ring gear. Gear units which achieve high reduction ratios due to a deformable toothed ring and eccentricity are of course also feasible.

The inside bearing ring, too, is possible with most different types of profiling. It is only important that the clamping element can adopt a safe position. The annular spring element which biasses the clamping element is not required to embrace the entire periphery. It is possible to arrange a leaf spring which is anchored in the vicinity of the clamping element only. A design of the spring element as a so-called 'beyond dead-center spring' (bangling tin frog) is also possible.

To prevent transverse forces or deformations which are due to the clamping effect, several clamping elements may be arranged evenly on the periphery.

List of Reference Numerals:

1	drive unit
2	reducing gear
3	reducing gear
4	friction lining
5	friction lining
6	brake disc
7	actuating element
8	motor casing
9	stator
10	electric motor
11	rotor
12	guide member
13	carrier
14	permanent magnet segment
15	gearbox case
16	threaded nut
17	threaded spindle
18	ball
19	spindle member
20	spindle member
21	spindle member
22	area
23	cover
24	radial bearing
25	
26	axial bearing
27	seal
28	slide ring
29	slide ring
30	sun wheel
31	planet wheel
31a	planet wheel
31b	planet wheel

32a planet wheel
32b planet wheel
33 ring gear
34 planet cage
35 freewheel mechanism
36 outside ring
37 inside ring
38 clamping element
39 recess
40 slope
41 profiling
42 spring element
43 actuating unit
44 electromagnet
45 tappet
46 position detection system
47 guide
48 accommodating member
49
50 radial bearing
51 outside ring

Patent Claims:

1. Actuating unit for an electromechanically actuated disc brake for automotive vehicles that is mounted on a brake caliper in which two friction linings (4, 5) are arranged that interact with each one lateral surface of a brake disc (6) so as to be slidable within limits, wherein one (4) of the friction linings (4, 5) is movable into engagement with the brake disc by the actuating unit directly by means of an actuating element (15) and the other friction lining (5) is movable into engagement with the brake disc (6) by the effect of a reaction force generated by the brake caliper, wherein the actuating unit is comprised of an electric motor (10) and a reducing gear (2) interposed between the electric motor (10) and the actuating element (15), and wherein a freewheel mechanism (35) is provided that is in interaction with the electric motor (10) and has the function of a parking brake,
c h a r a c t e r i z e d in that the freewheel mechanism (35) is configured so that its clamping effect is ensured by a form-locking torque transmission, and in that, in its actuated state, it prevents a rotational movement of a bearing (24) in which the rotor (11) of the electric motor (10) is mounted.

2. Actuating unit as claimed in claim 1,
c h a r a c t e r i z e d in that the freewheel mechanism (35) along with the bearing (24) forms a subassembly.

3. Actuating unit as claimed in claim 2,
c h a r a c t e r i z e d in that both the outside ring (36) and the inside ring (37) of the bearing (24) are extended on one side in such a fashion that they enter into a form-locking engagement with the clamping element (38) of the freewheel mechanism (35).

4. Actuating unit as claimed in claim 3,
c h a r a c t e r i z e d in that the inside ring (37) of the bearing (24) has a profiling (41) which permits a form-locking accommodation of the clamping element (38), and the outside ring (36) has at least one radial recess (39) and a subsequent slope or ramp (40) which, along with the profiling (41), limits at least one clamping slot in which the clamping element (38) is received.

5. Actuating unit as claimed in claim 4,
c h a r a c t e r i z e d in that the clamping element (38) is biassed in the direction of the recess (39) by means of a spring element (42).

6. Actuating unit as claimed in claim 5,
c h a r a c t e r i z e d in that the spring element (42) is configured as a circlip.

7. Actuating unit as claimed in claim 5,
c h a r a c t e r i z e d in that the spring element is configured as a leaf spring.

8. Actuating unit as claimed in any one of claims 1 to 7,
c h a r a c t e r i z e d in that the freewheel mechanism (35) is operable by means of an electromagnetic actuating unit (43).

9. Actuating unit as claimed in claim 8,
c h a r a c t e r i z e d in that the electromagnetic actuating unit (43) is comprised of an electromagnet (44) and a tappet (45) which is movable into a force-transmitting engagement with the clamping element (38).

10. Actuating unit as claimed in claim 9,
c h a r a c t e r i z e d in that the electromagnet (44) is designed as a bistable electromagnet.

11. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the clamping element (38) is designed as a jamming roller.

12. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the clamping element has the shape of a ball.

13. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the bearing (24) is designed as a ball bearing, a needle bearing, or a roller bearing.

14. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that a second reducing gear (3) is provided between the electric motor (11) and the reducing gear (2).

15. Actuating unit as claimed in claim 14,
c h a r a c t e r i z e d in that the electric motor (11), the (first) reducing gear (2), and the second reducing gear (3) are designed as at least two independent subassemblies.

16. Actuating unit as claimed in claim 14,
c h a r a c t e r i z e d in that the electric motor (11), the (first) reducing gear (2) and the second reducing gear (3) are designed as each one independent subassembly.

17. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the (first) reducing gear (2) is configured as a ball-and-thread drive assembly (16-18).

18. Actuating unit as claimed in claim 17,
c h a r a c t e r i z e d in that the actuating element (7) is formed by the threaded nut (16) of the ball-and-thread drive assembly (16-18).

19. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that the second reducing gear (3) is arranged on the side of the electric motor (10) remote from the brake linings (4, 5).

20. Actuating unit as claimed in any one of the preceding claims 14 to 19,
c h a r a c t e r i z e d in that the second reducing gear (3) is configured as a planetary gear.

21. Actuating unit as claimed in claim 20,
c h a r a c t e r i z e d in that the second reducing gear (3) is configured as a planetary gear with stepped planet wheels (31, 32).

22. Actuating unit as claimed in any one of claims 17 to 20,
c h a r a c t e r i z e d in that there is provision of a guide member (12) which embraces the threaded nut (16) of the ball-and-thread drive assembly (16-18), which is supported on a gearbox case (15) that accommodates the ball-and-thread drive assembly, and on which the threaded spindle (17), in turn, is axially supported.

23. Actuating unit as claimed in claim 22,
c h a r a c t e r i z e d in that the axial support of the threaded spindle (17) is carried out by the intermediary of an axial bearing (26) by means of a radial collar (14).

24. Actuating unit as claimed in claim 22 or 23,
c h a r a c t e r i z e d in that force-measuring elements are provided on the guide member.

25. Actuating unit as claimed in any one of the preceding claims 17 to 24,
c h a r a c t e r i z e d in that an elastic seal (27) is interposed between the threaded nut (16) and the guide member (12).

26. Actuating unit as claimed in any one of claims 20 to 25,
c h a r a c t e r i z e d in that the sun wheel (30) of the planetary gear is designed on the rotor (11), while the planet wheels (31, 32) are mounted in a planet cage (34) that is in a force-transmitting connection with the threaded spindle (17) and are comprised of each one first planet wheel (31a,32a) of large diameter that is in engagement with the sun wheel (30) and each one second planet wheel (31b, 32b) of small diameter that is in engagement with a ring gear (33).

27. Actuating unit as claimed in any one of claims 20 to 26,
c h a r a c t e r i z e d in that the ring gear (33) of the planetary gear is formed of an internal toothing in a cover (23) which represents a case of the planetary gear and is mounted on the casing (8) of the electric motor (10).

28. Actuating unit as claimed in any one of claims 20 to 27, c h a r a c t e r i z e d in that the transmission of force between the planet cage (34) and the threaded spindle (17) is effected by means of a form-locking plug coupling.

29. Actuating unit as claimed in any one of claims 20 to 28, c h a r a c t e r i z e d in that the planet cage (34) is mounted in the cover (23) by means of a radial bearing (50).

30. Actuating unit as claimed in claim 28 or 29, c h a r a c t e r i z e d in that the form-locking plug coupling is connected to the planet cage (34) in a torsion-proof, radially yielding and flexible fashion.

31. Actuating unit as claimed in any one of the preceding claims 18 to 30, c h a r a c t e r i z e d in that the threaded spindle (17) is of a multi-part design.

32. Actuating unit as claimed in any one of the preceding claims 18 to 31, c h a r a c t e r i z e d in that the threaded nut (16) at its end remote from the first friction lining (4) includes a projection which is movable into abutment with a stop that is provided on the threaded spindle (17) and acts in a circumferential direction.

33. Actuating unit as claimed in any one of the preceding claims, c h a r a c t e r i z e d in that the electric motor (11) is configured as an electronically commutated electric motor energized by a permanent magnet.

34. Actuating unit as claimed in any one of the preceding claims 1 to 32,
c h a r a c t e r i z e d in that the electric motor is configured as a switched reluctance motor.

35. Actuating unit as claimed in any one of the preceding claims,
c h a r a c t e r i z e d in that there is provision of a position detection system (46) which permits detecting the position of the rotor (11).

36. Actuating unit as claimed in claim 35,
c h a r a c t e r i z e d in that the position detection system (46) includes a Hall sensor.

37. Actuating unit as claimed in claim 35,
c h a r a c t e r i z e d in that the position detection system (46) includes a magnetoresistive element.

Abstract:

Actuating Unit for an Electromechanically Actuated Disc Brake

The present invention discloses an actuating unit for an electromechanically actuated disc brake for automotive vehicles which is basically composed of a drive unit (1) or an electric motor (10), an actuating element (7) by means of which one (4) of two friction linings (4, 5) slidably arranged in a brake caliper are moved into engagement with a brake disc (6), and a reducing gear (2). A freewheel mechanism (35) that interacts with the electric motor (10) has the function of a parking brake.

In order to ensure a high level of reliability in operation of the parking brake and to render it resistant to external influences, in particular, oscillations or vibrations, the present invention suggest that the freewheel mechanism (35) be configured in such a way that its clamping effect is produced by a form-locking torque transmission and that, in its actuated state, it prevents a rotational movement of a bearing (24) in which the rotor (11) of the electric motor (10) is mounted.

(Figure 2)

Declaration and Power of Attorney for Patent Application
Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Actuating Unit for an Electromechanically Actuated Disc Brake

deren Beschreibung hier beigefügt ist, es sei denn (in diesem Falle Zutreffendes bitte ankreuzen), diese Erfindung

the specification of which is attached hereto unless the following box is checked:

☒ wurde angemeldet am 15.09.2000 unter der US-Anmeldenummer oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT). PCT/EP00/09044

☒ was filed on 15/09/2000 as United States Application Number or PCT International Application Number PCTEP00/09044

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die durch einen oben erwähnten Zusatzantrag und in einem „preliminary amendment" abgeändert wurden, durchgesehen und verstanden habe.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above and as amended in a preliminary amendment.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die eventuell zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

German Language Declaration

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title 35, US-Code, § 119 (a)-(d), bzw. § 365(b) aller unten aufgeführten Auslandsanmeldungen für Patente oder Erfinderurkunden, oder §365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslands- anmeldungen für Patente bzw. Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

I hereby claim foreign priority under Title 35, United States Code, §119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

Number	Country	Day/Month/Year Filed	Priority Not Claimed Priorität nicht beansprucht
19945543.0	Germany	23/September/1999	☐
PCT/EP00/09044	PCT	15/September/2000	

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

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application designating the United States, listed below and, insofar as the
subject matter of each of the claims of this application is not disclosed in
the prior United States or PCT International application in the manner
provided by the first paragraph of Title 35, United States Code, § 112,
I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56
which became available between the filing date of the prior application
and the national or PCT International filing date of this application.

Application No. , filed on

Status: patented/pending/abandoned)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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